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INFRA-OCCLUDED PRIMARY MOLARS MANAGEMENT AND BENEFITS OF AN EARLY DIAGNOSIS

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Abstract:
Infraocclusion is a clinical term describing a tooth depressed below the occlusal plane. In this review we discuss the present literature on infraocclusion in primary molars, and also to demonstrate medical diagnosis as well as treatment approaches. We searched Medline, PubMed, Cochrane, and CINHAL databases for studies reporting and concerning with Infra-occluded teeth that was published in English language and in the period of establishment of these databases up to 2018. Infraocclusion of primary molars is a typical clinical finding. It describes a tooth that has fallen short to keep its placement about nearby teeth in the establishing dentition as well as is for that reason, inferior to the occlusal level. The age of the youngster at medical diagnosis and the rate of progression of infraocclusion play a critical function in case of management. Early diagnosis of infraocclusion within a basic method setting is essential in ensuring appropriate management of these situations and likewise to stop problems. Generally, the management of infra-occluded primary molars depends upon the extent and also development of infraocclusion, the presence or lack of the permanent successor, in addition to the patient's preference for the different therapy alternatives.

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INTRODUCTION:

The term "infraocclusion" defines a tooth which is located below the occlusal plane. Other terms practiced in the literature are submerged, impaction, reimpaction, re-inclusion and additional retention. Nonetheless, it is suggested that the term "infraocclusion" offers a good description of the clinical appearance as well as has actually gained boosting usage during recent years [1]. The term "ankylosis" has actually been also most widely used as a result of the medical, radiographic as well as histological proof, which recommended that the majority of infraoccluded teeth were ankylosed. The prevalence of infraocclusion of main molars is most generally reported to be in the region of 1.3-8.9%, nevertheless it can be as high as 38.5% [3], [4]. The peak occurrence remains in eight-to-nine year olds, with a greater incidence between siblings [3]. Infraocclusion has actually been reported to be typical in Caucasians without gender bias kept in mind [3]. Generally, mandibular molars are more typically influenced than maxillary molars with the mandibular first primary molar being one of the most typically affected tooth [3], [4]. Infraocclusion typically presents bilaterally with all teeth revealing comparable levels of infraocclusion [5].

This term refers to one feasible cause or frequent association with infraocclusion. It is thought that due to tooth ankylosis, the infraoccluded tooth remains in a fixed position while eruption of adjacent teeth appears [2]. The various other aspects associated with infraocclusion of primary teeth are congenitally missing out on permanent teeth, defects in the periodontal membrane, local mechanical trauma, a disturbed local metabolic rate, injury to the periodontal ligament, precocious eruption of the persistent very first molar or a mix of the stated variables [5], [6]. A familial propensity was also indicated as the aetiology of infraocclusion [7]. Infra-occluded teeth are more common with the primary teeth than the permanent teeth, and also mandibular main molars often tend to be infra-occluded more frequently than maxillary primary molars [2], [7].

Infraocclusion is a clinical term describing a tooth depressed below the occlusal plane. In this review we discuss the present literature on infraocclusion in primary molars, and also to demonstrate medical diagnosis as well as treatment approaches.

METHODOLOGY:

We searched Medline, PubMed, Cochrane, and CINHAL databases for studies reporting and concerning with Infra-occluded teeth that was published in English language and in the period of establishment of these databases up to 2018. We used Infra-occluded teeth and the following free Mesh terms; “Infra-occluded, teeth, primary molars, managment, and complications,”. And we restricted our search to the English-language literature on human subjects. Reference lists were screened manually to find more relevant studies.

DISCUSSION:

- **Aetiology**

Infraocclusion is extensively thought to be because of ankyloses [8]. It is suggested that damages to Hertwigs epithelial root sheath leads to a break in continuity of the periodontal membrane, causing straight contact of cementum or dentine with bone [9]. Hereditary factors have actually likewise been suggested given the grown occurrence of infraocclusion among siblings [2]. In addition, youngsters with one infraoccluded primary molar can regularly establish infraocclusion of additional teeth [6]. There is a grown frequency of various other dental anomalies in children who have infraoccluded teeth such as ectopic eruption of initial permanent molars, peg laterals, enamel hypoplasia and also palatal displacement of maxillary canines [10]. Another element believed to play a role in infraocclusion of primary molars is the absence of an irreversible follower tooth [11]. As much as 65.7% of individuals with developmentally-absent permanent premolars showed infraocclusion of main molar teeth [12].

- **Classification**

The severity of infraocclusion was specified by Messer and also Cline in 1980 as slight, moderate or severe. (Table 1). It is necessary to accurately document the intensity of infraocclusion at each evaluation, to make sure that the amount and also rate of development of infraocclusion can be checked. Infraocclusion can be recorded medically with straight measurement making use of adjacent teeth as reference or with medical pictures. Many clinicians likewise make use of research versions already accessible for orthodontic therapy planning.

Table 1. Classification of infraocclusion [13].

Severity	Definition
Slight	Between occlusal surface and interproximal contact, less than 2mm.
Moderate	Within occluso-gingival margins of interproximal contact.
Severe	Below interproximal contact point

- **Diagnosis**

Early recognition of infra-occluded teeth is important because it can assist in ideal and also timely management and also therefore prevent long-term complications from developing. Identifying infra-occluded main molars is mainly based on the clinical searchings for. The infra-occluded tooth will certainly be below the occlusal plane, with the marginal ridges of the infra-occluded tooth below those of the adjacent teeth [11]. Ankylosed teeth break down a sharp solid noise on a percussion examination in comparison to a cushion noise listened to in the typical teeth, nonetheless, this relies on subjective evaluation and a higher-pitched tone is more probable when a minimum of 20% of the root surface area is ankylosed [14]. Thus, it needs to never ever be utilized as a conclusive diagnostic device of ankylosis. Additionally, such teeth can present immobility, but just when greater than 10% of the root surface area is ankylosed. Nonetheless, prevalent root resorption on a stationary tooth is very allusive of ankylosis [15].

When infra-occlusion is detected clinically, radiographs are indicated to confirm the existence or lack of the permanent successor [1]. Periapical radiographs or dental panoramic radiographs (DPTs) can be made use of, each with their very own qualities. On conventional radiographs, obliteration of the periodontal ligament can normally be verifiable, however might not show up if the ankylosed location is very small [8]. As the ankylosis progresses, the roots of the influenced teeth come to be much less distinct from the surrounding bone as a result of minimized radiopacity of the roots [14]. Panoramic, occlusal, intraoral periapical radiographs and CT can be utilized to examine the area in between the infraoccluded and the adjacent teeth. CT has actually been shown to be more suitable to the conventional strategies in terms of visualization of the influenced teeth and the localization of the inferior alveolar nerve. As an example, by using CT, feasible injury to the inferior alveolar nerve can be stopped throughout surgeries. Moreover, CT can supply considerable info about the amount of bone volume for diagnosis and also treatment preparation, while Nasel et al. (1999) recommended taking dental magnetic resonance images (MRI) to specify the area of the nerve [16].

When a main molar is maintained, even when it is not infra-occluded, there will be an all-natural step in the occlusal plane due to the crown height of the main molar being less than that of the nearby permanent teeth [17]. If the primary molar is infra-occluded, this action will increase as the nearby teeth continue to appear whilst the primary molar remains static. Angular bony defects may establish in the interproximal bone bordering the infra-occluded tooth because of a cessation of vertical bone development generally related to eruption [18].

- **Consequences**

An infraoccluded deciduous tooth can trigger developing abnormalities, such as tooth agenesis, microdontia of maxillary lateral incisors, palatal position of maxillary canines, and distal angulation of mandibular second premolars. Moreover, occlusal disruptions such as tilting of the nearby teeth result in lowered dental arch space, specifically when extreme ankylosis of the second primary molars takes place in very early combined dentition, as well as supra-eruption of the antagonists [20]. One of the most recognizable tipping was observed mesially and also distally to an infraoccluded main mandibular second molar [22]. Decreased arch length has been shown to take place in 28-43% of cases with submerged primary molars, with mandibular secondary molars being one of the most common tooth related to space-loss [21].

Ectopic eruption or the impaction of the successor premolar, with added increase in cavities and also periodontal illness susceptibility are some other manifestations [19]. Nonetheless, according to Dewhurst et al. (1997) the infraocclusion of primary deciduous molars does not hazard the periodontal tissues of the upcoming very first molars [23].

Preserved roots are one more possible consequences of the submerged primary molars, although there is no evidence in the literary works to recommend that the maintained roots are a detrimental side-effect of

infraocclusion [19].The cementoenamel junction (CEJ) alveolar bone range is shorter than the regular, due to the fact that the exfoliation of the primary tooth is unusual adhered to by the termination of eruption. Consequently, extreme ankylosis may harm the alveolar assistance for the premolar [1].

In case of serious submersion, medical disruptions might consist of insufficient alveolar procedure advancement, lack of normal mesial drift, non-response to orthodontic forces, preserved primary teeth with or without a successor as well as impaction of the successor, a clinically depressed tooth with tipping surrounding teeth, supra-eruption of opposing teeth, lateral open bite and also greater frequency of crossbites, but according to Kurol and Thilander, these disruptions have no long-lasting results on occlusion [1]. Nonetheless, Becker and also Shochat identified a substantial variance in the dental inter-incisor midline towards the afflicted side [24]. The potential repercussions of infraoccluded teeth have actually been widely reported in the literature as well as are summed up in Table 2.

Table 2. Consequences of infraocclusion of primary molars and their implication for the patient [1],[19-23].

Consequences of infraocclusion of primary molars	**Implication for patient**
Tipping of adjacent teeth	Orthodontic treatment to upright tooth. Risk of caries. Increases need for active intervention
Overeruption of opposing teeth	Orthodontic treatment.
Lateral open bite or crossbite	Increased need of orthodontic treatment.
Caries of infraoccluded teeth or adjacent teeth	Restorative dental treatment. Extraction if causing pain or infection.
Hypoplasia or deflection of successor tooth	Restorative dental treatment.
Impaction of successor tooth	Extraction if severe.
Delayed exfoliation of primary tooth	Delay in commencing orthodontic treatment.
Progression of infraocclusion	Possible need for extraction if rapid.
Early extraction of severely infraoccluded primary molar	Space maintenance. Orthodontic treatment to correct space loss.
Increased difficulty of extraction	Fracture of primary molar tooth/retained roots. Surgical extraction

- **Management**

Early medical diagnosis of infra-occlusion plays a crucial role in its administration and is necessary to prevent problems from developing. Factors which are very important to think about when therapy planning people with infra-occluded primary molars include [25]:

- Presence or absence of the permanent successor;
- Severity of infra-occlusion;
- Patient age and gender;
- Likely progression of infra-occlusion;
- Long-term prognosis of the infra-occluded tooth.

The management of infraoccluded primary molars is influenced by the presence or absence of the permanent successor.

Decision-making model of treating infraoccluded primary molars without successors

It is common result to have actually ankylosed primary molars with missing out on premolars [10]. Problem is now refocused on the development of ample alveolar bone assistance and also on retention methods. Research studies reveal that healing of bone just happens in cases where a successor exists [27].

The day of start can be identified making use of Darling as well as Levers estimation patterns [15]. They developed age at beginning by outlining measured infraocclusion at each age on a standard chart of the normal occlusal level and theorized the plotted point to converge with the standard curve to offer the estimated age of onset of ankylosis. The determination of start of ankylosis is separated right into early and late. Late beginning instances will likely require accumulation treatments to raise tooth height and reestablish occlusion [28]. The occlusal, labial and lingual surfaces can be accumulated with composite material, stainless steel crowns, cast porcelain, cast nickelchrome or gold onlays [29]. Unique concerns to be familiar with are the possible requirement for a remake as adjoining teeth remain to emerge. A late diagnosis of an early onset instances has a greater possibility of problems. Therapy may

consist of orthodontic uprighting of tipped adjacent teeth and also subsequent restorative treatments. Research studies encourage orthodontic adjustment of tipped adjacent teeth to assist in much easier extraction if required and accomplish favourable arch placement [27]. Early medical diagnosis is the key to avoid these issues.

Root traction rates can be divided into rapid as well as slow-moving, but keep in mind that infraoccluded molars without successors tend to have slow-moving exfoliation rates [1]. In cases where root traction rates were fast, observation as well as surveillance with remediation of function after exfoliation is the suggested program of therapy. Indicators of slow-moving root resorption leads one to assess the rate of progression of infraocclusion of the ankylosed tooth. Slow progression of infraocclusion of a gradually resorbing ankylosed tooth indicates a potentially longer period of retention and also is suggestive of build-up treatments with ideal recalls for reassessment. The medical professional must note that the possibility for ridge issues should always be assessed and might reroute therapy to take into consideration removal. The restorative selections are orthodontic closure, prosthodontic substitute, or implants [28]. It is important for appointments with the ideal experts, such as orthodontists, implantologists, prosthodontics and periodontists, for the complete treatment of such individuals.

Fast progression of infraocclusion with a gradually resorbing tooth might call for immediate treatment, with the much more prominent option being extraction due to the better sense of control. An additional therapy option is luxation to damage the bridge of ankylosis without harming the apical vessels, allowing tooth eruption to return to [5]. Its lack of popularity may be due to its invasive nature and also unforeseeable results.

Decision-making model of treating infroccluded primary molars with successors

The major objective of therapy of infraoccluded primary molars with successors is to permit the typical eruption of the successor [31]. Once more, the initial choice is to figure out the moment of onset. Late beginning cases normally are in slight infraocclusion; hence, therapy objectives are focused on exfoliation of the ankylosed tooth. If fast progression of infraocclusion is likely, there need to be consideration for extraction as well as space upkeep only if the traction rate of the ankylosed tooth is slow. If exfoliation is not accomplished within the accepted delay time of 6 months, removal should follow [21]. It is best to prevent removals too early due to a threat of surgical trauma to the succedaneous toothbud [33]. After removal or exfoliation, the location must be checked out for root fragments as a result of irregular traction of the mesial and distal origins [30]. For cases revealing slow progression of infraocclusion and sluggish traction rates, options are removal and area upkeep or build-up treatments leading to regular exfoliation. Early start cases are separated into those identified early and also those detected late. Late diagnosis of early beginning conditions is most likely to provide with tipped surrounding teeth and also supereruption of the antagonist and therefore might indicate orthodontic treatment adhered to by extraction as well as reconstruction.

Early medical diagnosis of early start situations has the advantage of using Messer and Clines' medical patterns of infraocclusion main molars to anticipate problems [30]. The medical professional is advised to keep an eye on ankylosed mandibular very first molars, as they are normally a little infraoccluded and also have a tendency to exfoliate generally. Energetic monitoring consists of research study models and also space measurements. Mandibular second molars have a tendency to present in mild to moderate infraocclusion. Removal is shown if the tooth ends up being reasonably infraoccluded or if the molar stops working to exfoliate on time with a lower lingual arch (LLA) space maintainer. The propensity of ankylosed maxillary molars to be drastically infraoccluded generally suggests very early removal [32]. A distal shoe maintainer is a valuable appliance in situations where extraction before the eruption of the initial permanent molar is required.

CONCLUSION:

Infraocclusion of primary molars is a typical clinical finding. It describes a tooth that has fallen short to keep its placement about nearby teeth in the establishing dentition as well as is for that reason, inferior to the occlusal level. The age of the youngster at medical diagnosis and the rate of progression of infraocclusion play a critical function in case of management. Early diagnosis of infraocclusion within a basic method setting is essential in ensuring appropriate management of these situations and likewise to stop problems.

Generally, the management of infra-occluded primary molars depends upon the extent and also development of infraocclusion, the presence or lack of the permanent successor, in addition to the patient's preference for the different therapy alternatives. When the permanent successor exists, and also the infraocclusion is mild or moderate, the infra-occluded tooth usually has an excellent diagnosis. When the permanent successor is lacking and the infra-occlusion is mild or moderate, it is

generally better to keep track of the affected tooth or bring back the occlusal surface, if needed. When infra-occlusion is serious, one of the most suitable choice might be to remove the affected tooth. Effective administration depends on early diagnosis, excellent interaction between the client and also the medical professional and reference for an orthodontic viewpoint, where ideal.

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